

1st Quarter Review

Name _____ Date _____ Period _____

Without graphing determine the end behavior of each polynomial.

1. $f(x) = x^2 - 5x + 7$

$\lim_{x \rightarrow +\infty} f(x) =$ $\lim_{x \rightarrow -\infty} f(x) =$

2. $f(x) = -3x^3 + 8x^2 + 9x - 4$

$\lim_{x \rightarrow +\infty} f(x) =$ $\lim_{x \rightarrow -\infty} f(x) =$

Simplify each expression by performing the proper operation.

3. $(2x^2 + 6x - 5) + (-x^2 + 4x + 7)$

4. $(3x^3 - 5x + 2) - (-x^3 + 4x^2 - 2)$

5. $(-3x^2 + 2x - 1)(5x^2 - 3)$

6. $\frac{5x-15}{6x+12} \cdot \frac{x+2}{x^2+3x-18}$

7. $\frac{8x^2-32x}{x^2+3x-28}$

8. $\frac{-5}{x-2} + \frac{6}{x+3}$

9. $\frac{x-1}{x^2-x-6} - \frac{2x}{x-3}$

10. $\frac{4x^2}{x^2-x-6} \div \frac{2x}{x+2}$

11. Given $x^3 - 3x^2 - 4x + 12$, which of the following is a factor?

a) $(x+1)$

b) $(x-1)$

c) $(x+3)$

d) $(x-2)$

Without graphing, determine the greatest possible number of zeros for the functions given.

12. $x^5 - 5x^4 + 2x - 7$

13. $-2x^4 + x^3 - 2x$

14. Using the factored form of the polynomial given, identify all of the zeros, their multiplicity, and whether they touch or cross at the x-axis. (Write zeros as points!)

$$f(x) = x^5(x-5)^3(x+1)^2$$

Zero	Multiplicity	Touch/Cross

Factor each polynomial. (Use identities when necessary.)

15. $x^2 + 5x - 24$

16. $2x^2 + x - 6$

17. $4x^2 - 1$

18. $27t^3 - 8$

19. $125y^3 + 64$

20. $2x^3 + 10x^2 + x + 5$

Factor over the complex numbers.

21. $x^2 - 6x + 13 = 0$

22. $x^2 + 4 = 0$

Solve using the quadratic formula.

23. $x^2 - 5x + 2 = 0$

Write out the series and evaluate the sum.

24. $\sum_{n=1}^5 5n - 8$

Write the series using sigma notation.

25. $-3 + 1 + 5 + \dots + 33$

26. A professional track athlete signs a contract with a beginning salary of \$150,000 for the first year and an annual increase of 3% per year beginning in the second year. How much money in total will the athlete make if his contract is for 5 years? Round to the nearest dollar.

Find the domain for the rational expressions.

27. $\frac{2}{x-5}$

28. $\frac{3x}{x^2 + 5x + 6}$

29. $\frac{x-9}{x^2 - 6x}$

Solve each equation.

30. $\sqrt{3x-7} - 6 = -4$

31. $\frac{2}{x-4} + \frac{1}{3x} = \frac{8}{x^2 - 4x}$

32. $\sqrt[3]{3x+5} = -2$

33. $(x-5)^{\frac{3}{2}} + 8 = 35$

34. The height a ball bounces is less than the height of the previous bounce due to friction. Suppose a ball is dropped from a height of 5 feet and rebounds to 97% of the height of the previous bounce. What is the total vertical distance traveled by the ball when it comes to rest?

Simplify using long division. Write answer in polynomial form. Show work!

35. $\frac{x^3 + 5x^2 - x - 14}{x + 2}$

36. $\frac{x^3 - 2x^2 + 3x - 10}{x - 1}$

Expand the binomial using the Binomial Theorem or Pascal's Triangle.

37. $(x + 2)^4$

38. $(2x - 1)^6$

39. Because of friction and air resistance, each swing of a pendulum is a little shorter than the previous one. Suppose the first swing of a pendulum has a length of 8 inches and the return is 7.52 inches. What is the total distance traveled by the pendulum when it comes to rest?